

PATENT COOPERATION TREATY

From the INTERNATIONAL SEARCHING AUTHORITY

PCT

NOTIFICATION OF TRANSMITTAL OF
THE INTERNATIONAL SEARCH REPORT AND
THE WRITTEN OPINION OF THE INTERNATIONAL
SEARCHING AUTHORITY, OR THE DECLARATION

To:	F.R. KELLY & CO Attn. Boyce, Conor 27 Clyde Road Dublin 4 IRLANDE
RECEIVED 15 SEP 2008 Computer Diaried MB DATE:	

(PCT Rule 44.1)

Applicant's or agent's file reference P88654PC00/c	FOR FURTHER ACTION See paragraphs 1 and 4 below
International application No. PCT/EP2008/052329	International filing date (day/month/year) 26/02/2008
Applicant FOTONATION VISION LIMITED	

1. The applicant is hereby notified that the international search report and the written opinion of the International Searching Authority have been established and are transmitted herewith.

Filing of amendments and statement under Article 19:

The applicant is entitled, if he so wishes, to amend the claims of the International Application (see Rule 46):

When? The time limit for filing such amendments is normally two months from the date of transmittal of the International Search Report.

Where? Directly to the International Bureau of WIPO, 34 chemin des Colombettes
1211 Geneva 20, Switzerland, Fascimile No.: (41-22) 338.82.70

For more detailed instructions, see the notes on the accompanying sheet.

2. The applicant is hereby notified that no international search report will be established and that the declaration under Article 17(2)(a) to that effect and the written opinion of the International Searching Authority are transmitted herewith.

3. **With regard to the protest** against payment of (an) additional fee(s) under Rule 40.2, the applicant is notified that:

- the protest together with the decision thereon has been transmitted to the International Bureau together with the applicant's request to forward the texts of both the protest and the decision thereon to the designated Offices.
- no decision has been made yet on the protest; the applicant will be notified as soon as a decision is made.

4. **Reminders**

Shortly after the expiration of **18 months** from the priority date, the international application will be published by the International Bureau. If the applicant wishes to avoid or postpone publication, a notice of withdrawal of the international application, or of the priority claim, must reach the International Bureau as provided in Rules 90bis.1 and 90bis.3, respectively, before the completion of the technical preparations for international publication.

The applicant may submit comments on an informal basis on the written opinion of the International Searching Authority to the International Bureau. The International Bureau will send a copy of such comments to all designated Offices unless an international preliminary examination report has been or is to be established. These comments would also be made available to the public but not before the expiration of 30 months from the priority date.

Within **19 months** from the priority date, but only in respect of some designated Offices, a demand for international preliminary examination must be filed if the applicant wishes to postpone the entry into the national phase **until 30 months** from the priority date (in some Offices even later); otherwise, the applicant must, **within 20 months** from the priority date, perform the prescribed acts for entry into the national phase before those designated Offices.

In respect of other designated Offices, the time limit of **30 months** (or later) will apply even if no demand is filed within 19 months.

See the Annex to Form PCT/IB/301 and, for details about the applicable time limits, Office by Office, see the *PCT Applicant's Guide*, Volume II, National Chapters and the WIPO Internet site.

Name and mailing address of the International Searching Authority  European Patent Office, P.B. 5818 Patentlaan 2 NL-2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016	Authorized officer Brigitte Chiarizia
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PATENT COOPERATION TREATY

PCT

INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference P88654PC00/c	FOR FURTHER ACTION	
	see Form PCT/ISA/220 as well as, where applicable, item 5 below.	
International application No. PCT/EP2008/052329	International filing date (day/month/year) 26/02/2008	(Earliest) Priority Date (day/month/year) 28/02/2007
Applicant FOTONATION VISION LIMITED		

This international search report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This international search report consists of a total of 4 sheets.

It is also accompanied by a copy of each prior art document cited in this report.

1. Basis of the report

a. With regard to the **language**, the international search was carried out on the basis of:

the international application in the language in which it was filed
 a translation of the international application into _____, which is the language of a translation furnished for the purposes of international search (Rules 12.3(a) and 23.1(b))

b. This international search report has been established taking into account the **rectification of an obvious mistake** authorized by or notified to this Authority under Rule 91 (Rule 43.6bis(a)).

c. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, see Box No. I.

2. **Certain claims were found unsearchable** (See Box No. II)

3. **Unity of invention is lacking** (see Box No III)

4. With regard to the **title**,

the text is approved as submitted by the applicant
 the text has been established by this Authority to read as follows:

5. With regard to the **abstract**,

the text is approved as submitted by the applicant
 the text has been established, according to Rule 38.2(b), by this Authority as it appears in Box No. IV. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority

6. With regard to the **drawings**,

a. the figure of the **drawings** to be published with the abstract is Figure No. 4

as suggested by the applicant
 as selected by this Authority, because the applicant failed to suggest a figure
 as selected by this Authority, because this figure better characterizes the invention

b. none of the figures is to be published with the abstract

INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2008/052329

A. CLASSIFICATION OF SUBJECT MATTER		
INV.	G06K9/00	G06K9/46
		G06K9/64
According to International Patent Classification (IPC) or to both national classification and IPC		
B. FIELDS SEARCHED		
Minimum documentation searched (classification system followed by classification symbols)		
G06K		
Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched		
Electronic data base consulted during the international search (name of data base and, where practical, search terms used)		
EPO-Internal		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	<p>J. BUENAPOSADA: "Efficiently estimating facial expression and illumination in appearance-based tracking" PROC. BRITISH MACHINE VISION CONFERENCE, [Online] 4 September 2006 (2006-09-04), XP002494036 Retrieved from the Internet: URL: http://www.bmva.ac.uk/bmvc/2006/ > [retrieved on 2008-09-01] Section 2. "The model", Section 4.1. "Model building"</p> <p>-----</p> <p>US 2001/038714 A1 (MASUMOTO DAIKI [JP] ET AL) 8 November 2001 (2001-11-08) figures 3-10 paragraph [0070] - paragraph [0095]</p> <p>-----</p> <p>-/-</p>	1-3, 16
X		1-3, 16
<p><input checked="" type="checkbox"/> Further documents are listed in the continuation of Box C.</p> <p><input checked="" type="checkbox"/> See patent family annex.</p>		
<p>* Special categories of cited documents :</p> <p>*A* document defining the general state of the art which is not considered to be of particular relevance</p> <p>*E* earlier document but published on or after the international filing date</p> <p>*L* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)</p> <p>*O* document referring to an oral disclosure, use, exhibition or other means</p> <p>*P* document published prior to the international filing date but later than the priority date claimed</p> <p>*T* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention</p> <p>*X* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone</p> <p>*Y* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.</p> <p>*&* document member of the same patent family</p>		
Date of the actual completion of the international search		Date of mailing of the international search report
1 September 2008		15/09/2008
Name and mailing address of the ISA/ European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016		Authorized officer Grigorescu, Cosmin

INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2008/052329

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	JP 2005 164475 A (MITUTOYO CORP) 23 June 2005 (2005-06-23) the whole document & EP 1 887 511 A (NIPPON ELECTRIC CO [JP]) 13 February 2008 (2008-02-13) the whole document -----	1-3,16
A	S. LI AND A.K. JAIN (EDS.): "Handbook of face recognition" 2005, SPRINGER , XP002494037 T. Cootes et al - Chapter 3. "Modeling Facial Shape and Appearance" -----	1-3,16
A	ROMDHANI S ET AL: "Identification by Fitting a 3D Morphable Model using linear Shape and Texture Error Functions" EUROPEAN CONFERENCE ON COMPUTER VISION, BERLIN, DE, 1 January 2002 (2002-01-01), pages 1-15, XP003018283 the whole document -----	1-3,16
A	EP 1 128 316 A (EASTMAN KODAK CO [US]) 29 August 2001 (2001-08-29) the whole document -----	6-15

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No
PCT/EP2008/052329

Patent document cited in search report	Publication date	Patent family member(s)		Publication date
US 2001038714	A1 08-11-2001	JP 2001307096	A	02-11-2001
JP 2005164475	A 23-06-2005	NONE		
EP 1887511	A 13-02-2008	CN 101189637	A	28-05-2008
		WO 2006129791	A1	07-12-2006
EP 1128316	A 29-08-2001	DE 60116949	T2	19-10-2006
		JP 2001309225	A	02-11-2001
		US 2005264658	A1	01-12-2005
		US 6940545	B1	06-09-2005

PATENT COOPERATION TREATY

From the
INTERNATIONAL SEARCHING AUTHORITY

To:

see form PCT/ISA/220

PCT

WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY (PCT Rule 43bis.1)

Date of mailing
(day/month/year) see form PCT/ISA/210 (second sheet)

Applicant's or agent's file reference
see form PCT/ISA/220

FOR FURTHER ACTION

See paragraph 2 below

International application No.
PCT/EP2008/052329

International filing date (day/month/year)
26.02.2008

Priority date (day/month/year)
28.02.2007

International Patent Classification (IPC) or both national classification and IPC
INV. G06K9/00 G06K9/46 G06K9/64

Applicant
FOTONATION VISION LIMITED

1. This opinion contains indications relating to the following items:

- Box No. I Basis of the opinion
- Box No. II Priority
- Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- Box No. IV Lack of unity of invention
- Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- Box No. VI Certain documents cited
- Box No. VII Certain defects in the international application
- Box No. VIII Certain observations on the international application

2. FURTHER ACTION

If a demand for international preliminary examination is made, this opinion will usually be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA") except that this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1bis(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of 3 months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

3. For further details, see notes to Form PCT/ISA/220.

Name and mailing address of the ISA:



European Patent Office - P.B. 5818 Patentlaan
NL-2280 HV Rijswijk - Pays Bas
Tel. +31 70 340 - 2040 Tx: 31 651 epo nl
Fax: +31 70 340 - 3016

Date of completion of
this opinion

See form
PCT/ISA/210

Authorized Officer

Grigorescu, Cosmin

Telephone No. +31 70 340-4889



Box No. I Basis of the opinion

1. With regard to the **language**, this opinion has been established on the basis of:
 the international application in the language in which it was filed
 a translation of the international application into , which is the language of a translation furnished for the purposes of international search (Rules 12.3(a) and 23.1 (b)).
2. This opinion has been established taking into account the **rectification of an obvious mistake** authorized by or notified to this Authority under Rule 91 (Rule 43bis.1(a))
3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application and necessary to the claimed invention, this opinion has been established on the basis of:
 - a. type of material:
 a sequence listing
 table(s) related to the sequence listing
 - b. format of material:
 on paper
 in electronic form
 - c. time of filing/furnishing:
 contained in the international application as filed.
 filed together with the international application in electronic form.
 furnished subsequently to this Authority for the purposes of search.
4. In addition, in the case that more than one version or copy of a sequence listing and/or table relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.
5. Additional comments:

**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY**

International application No.
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**Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or
industrial applicability; citations and explanations supporting such statement**

1. Statement

Novelty (N)	Yes: Claims	<u>4-15</u>
	No: Claims	<u>1-3,16</u>
Inventive step (IS)	Yes: Claims	
	No: Claims	<u>1-16</u>

Industrial applicability (IA)

Yes: Claims 1-16

No: Claims

2. Citations and explanations

see separate sheet

Box No. VIII Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

see separate sheet

1 Reference is made to the following documents:

D1: **J. Buenaposada**: "*Efficiently estimating facial expression and illumination in appearance-based tracking*" Proc. British Machine Vision Conference, [Online] 4 September 2006 (2006-09-04), XP002494036 Retrieved from the Internet: URL:<http://www.bmva.ac.uk/bmvc/2006/> [retrieved on 2008-09-01]

D2: **US 2001/038714 A1** (Masumoto Daiki [JP] et al) 8 November 2001 (2001-11-08)

D3: **EP 1 887 511** (Ishiyama Rui, NEC Corp.), with the same contents as the patent family member JP 2005 164475 A (MITUTOYO CORP) published on 23 June 2005 (2005-06-23)

D4: **T. Cootes et al**: "Modeling Facial Shape and Appearance", S. Li and A.K. Jain (Eds.): "Handbook of face recognition", Chapter 3, 2005, Springer , XP002494037

D5: **Romdhani S et al**: "*Identification by Fitting a 3D Morphable Model using Linear Shape and Texture Error Functions*", European Conference on Computer Vision, Berlin, DE, 1 January 2002 (2002-01-01), XP003018283

D6: **EP-A-1 128 316** (Eastman Kodak Co [US]) 29 August 2001 (2001-08-29)

VIII. Clarity (Art. 6 PCT)

2.1 The phrasing "determining a certain characteristic" in the preamble of claim 1 is vague and obscure (Art. 6 PCT).

2.2 Claim 1 lacks essential features, Art. 6 PCT, Guidelines 5.33. The recited "texture model", together with the fit (step (d)) are entirely based on an active appearance model performed on the image patches around facial landmark points.

Equally, the fact that certain model components are illumination-dependent while others are illumination-independent is a result of the specific design and training of said model - a result to be achieved, PCT Guidelines 5.35 - and not an intrinsic property of the model itself. The phrasing "training data set" is considered as insufficient to indicate that an illumination-specific training is performed.

Other understandings derivable from the present wording of claim 1 in the absence of the underlined features lack proper support (Art. 6 PCT).

2.3 It is not immediately apparent which of the recited steps delivers the "corrected face image"

recited in step (f) of claim 1. It has been assumed that the phrasing refers to the face image obtained after step (d).

2.4 The logical sequence of the claimed steps (b) and (c) seems to be inverted. With reference to the description, the step of fitting delivers sensible result when performed *after* the face detection, see Section "Close initialization requirement", p. 18, l. 20 - p. 19, l. 4.

V. Novelty and inventive step (Art. 33(2) and (3) PCT)

Independent claims 1, 16

3 The present application does not meet the criteria of Art. 33(1) PCT, because the subject-matter of claims 1 and, respectively, 16 are not new in the sense of Art. 33(2) PCT.

3.1 Document D1: Buenaposada discloses the features of claim 1 as follows (references in parentheses identify the relevant passages of D1):

A method for determining variations in the appearance of a face or an object caused by the variations in the illumination (therefore "determining a characteristic of a face or an object within a scene", see abstract) provided with the steps of:

(a) acquiring a digital image including a face or a certain other object within a scene (Section 4.1. "Model building", Fig. 2);

(c) determining an initial location of the face or certain object in the scene (idem, text immediately preceding said figure);

(b) applying a linear texture model that is constructed based on a training data set (Section 4.1. "Model building", Eq. (1)) and that comprises a class of objects including a first subset of model components that exhibit a dependency on directional lighting variations (Section 2. "The model", the components of the linear subspace with basis B_s) and a second subset of model components which are independent on directional lighting variations (the components of the linear subspace with basis B_d);

(d) obtaining a fit of said model to said face or certain object including adjusting one or more individual values of one or more of the model components of said linear texture model

(Sections 3.2. "Minimising $E(\mu,c)$ ", 3.3. "The algorithm");

- (e) based on the obtained fit of the model to said face or certain object in the scene, determining at least one characteristic of the face or certain other object (variation in lighting, see 2.1 above);
- (f) electronically storing, transmitting, applying a face or object recognition program to, editing, or displaying the obtained face image (see 2.3 above) or certain other object including the determined characteristic, or combinations thereof (implicit in the implementation of the tracking experiments described in Section 4.2.)

As all the recited features are anticipated by D1, claim 1 and, *mutatis mutandis*, claim 16 lack novelty (Art. 33(2) PCT).

3.2 The claimed features have been also identified in the document D2:US 2001/038714 as follows:

(a) - Fig. 1, step S11; (c) - the "texture model" is identified with the mathematical model which expresses the photometric partial variation space by PCA decomposition, par. 0071 - 0088, said model decomposing the possible variation space into a "geometric variation space Ω " which is illumination-independent and a "photometric variation space Ψ " which is illumination-dependent, see also Eq. 14; (b) - Fig. 1, step S12; (d)-(f) - par. 0091-0099.

Claim 1 and, respectively, 16, lack therefore novelty with respect to D2 (Art. 33(2) PCT).

Dependent claims 2-15

4.1 The features of the dependent claims 2 and 3 are also anticipated by either of the documents D1 or D2 when taken alone and are therefore not novel (Art. 33(2) PCT).

4.2 Dependent claims 4-15 recite limitations which are mere juxtapositions when considered in combination with the features of claims 1 since it is considered as well-known to control or adjust the various image acquisition parameters in response to the determination of an object illumination conditions.¹ This functional adaptation has become a commonplace feature in

¹Such conclusion is evident from the way in which the present application makes reference to various other patent documents describing these features, see description, p. 21-23.

**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING
AUTHORITY (SEPARATE SHEET)**

International application No.

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present digital cameras, see e.g. D6. In the absence of any specific functional interaction which would amount to an unexpected combined effect, the features of the claims 4-15 are considered to lack inventive step (Art. 33(3) PCT).